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A New Subgenus and Species of *Symbiocladius* from South America (Diptera: Tendipedidae).

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Through the courtesy of Dr. Pedro Wygodzinsky, American Museum of Natural History, I was able to examine a series of immature tendipedids and one female adult associated with mayfly nymphs. These specimens, representing a new species of *Symbiocladius*, were collected from Tierra del Fuego and Santa Cruz, Argentina. The immature stages develop dorso-laterally on mayfly nymphs of the genus *Thraulodes?* (Leptophlebiidae) in a manner similar to that of previously described *Symbiocladius* larvae and pupae. Certain adult characters (6-segmented ♀ antenna, hairy eyes, long pectinate empodium, subequal spurs on tarsi III) and the lateral development of the immature stages justify, in my opinion, the erection of a new subgenus for this new species. Table I compares some characters of the subgenera. Some figures of larval characters of *S. equitans* are also offered for comparison (Figs. 3-5).

The genus *Symbiocladius* s. str. is known from Europe (Fontaine 1964, Codreanu 1939, Šulc and Zavřel 1924), North America (Claassen 1922, Roback 1953), and Japan (Ueno 1930). This appears to be the first record of this genus from South America and from mayflies of the family Leptophlebiidae. All other records are from heptageniid nymphs. This latter family does not occur in South America.

Codreanu (1939) and Fontaine (1964) have adequately summarized the history and synonymy of *Symbiocladius* and it need not be repeated here.

The location of specimens is indicated after the localities given, (AMNH), American Museum of Natural History and (ANSP), Academy of Natural Sciences of Philadelphia. The letters (L) or (R) indicate whether the larva or pupa was on the left or right side of the mayfly nymph. Figures 1 and 2 are by Mr. Robert P. Moore, the remainder by the author.

I should like to acknowledge the help of Dr. James E. Sublette who provided me with notes on some characters of the type of *S. equitans* not given in the original description.

Subgenus **SYMBIOCLADIUS** Kieffer

1925 Ann. Soc. Scient. Brux. 44, fasc. 3: 565-566

Type species *Phaenocladus rhithrogenae* Zavřel 1924, by original designation.

Included species *Trissocladus equitans* Claassen 1922

Eyes bare; antennal flagellum of female 5-segmented (*rhithrogenae*); spurs of tibia III very unequal or smaller spur absent; empodium short, not pectinate; claws with or without basal spines; immature stages under wing pads of nymphs of heptageniid mayflies; Europe, North America, Japan.

TABLE 1. Comparison of some characters of *Symbiocladus s. str.* and *Acladius n. sgn.*

	<i>Acladius</i>	<i>Symbiocladus</i>	
	<i>wygodzinskyi</i>	<i>equitans</i>	<i>rhithrogenae</i>
eyes	haired	bare	bare
female antennal flagellum	6 segments	—	5 segments
palpal segments	3 = 2	3 = 2	3 < 2
spurs tibia III	almost equal	only larger present	very unequal
empodium	long, pectinate	short	short
basal spines on claws	3 long spines	1-2 fine spines	none
position of immatures on mayfly	latero-dorsally	under wing pads	under wing pads
lateral labial teeth, larva	5 robust	4-5 fine	5 fine
mandibular teeth	1 robust & accessory	1 heavy & 2 fine	3 fine

Subgenus **ACLETIUS**—new subgenus

Type species *Symbiocladius wygodzinskyi* new species by present designation.

Eyes haired, Fig. 12; female antennal flagellum 6-segmented; spurs of tibia III, Fig. 18, almost equal; empodium, Fig. 19, long, pectinate; claws with basal spines; immature stages along side and dorsum of body of nymphs of leptophlebiid mayflies; South America.

Symbiocladius (Acletius) wygodzinskyi n. sp.

The characters given in the subgeneric diagnosis and Table 1 will suffice to separate this species from its nearest relatives.

Female 5.1 mm; head, Fig. 12, black-brown; antennal flagellum 6-segmented; segments in ratio 14-8-10-10-14-33; pedicel black with one ventral hair; palpi 3 segmented; segments in ratio 9-18-18; eyes haired; hairs as long as diameter of facets; eyes widely separated; head width only 1.2 times dorsal interocular space; no bristles on vertex or postocular areas; labrum short, 4 bristles.

Pronotum reduced, Figs. 15, 16; with about 6-7 latero-ventral hairs on each lobe.

Mesonotum, Fig. 5, black-brown; vittae not too distinct, slightly more shining than surrounding area; no acrosticals, humerals or postalar bristles; supra-alars and dorso-centrals reduced, Fig. 13; scutellum black-brown; bristles as in Fig. 13; postnotum and mesosternum black-brown.

Legs light brown; base of tibia and apical tarsal segment darker; the ratios of the leg segments are as follows:

Leg	Femur	Tibia	T ₁	T ₂	T ₃	T ₄	T ₅	LR
I	100	119	77	38	23	12	12	.64
II	117	121	52	29	19	11	13	.43
III	120	130	70	37	19	11	14	.54

spur I .054 mm, Fig. 17; spurs II broken; spurs III .078, .062 mm, Fig. 18; no comb on tibia III; claw, Fig. 19, sharp; empodium well developed; only very rudimentary pulvilli present.

Wing slightly teneral; with fine microtrichiae; no macrotrichiae; *fCu* distinctly past *r-m*; *C* slightly produced; R_{2+3} present but very faint; halteres with globe light, shaft darker.

Abdomen brown, hairs set in light sockets; apex of abdomen as in Fig. 14; spermathecae (2) with base narrowly brown and a reticulate brown collar around exit of duct; .15 by .18 mm; genital clasper .22 mm long by .14 mm wide.

Male—dissected from mature male pupa; color as in female; eyes barely produced dorsally; antennal flagellum 13-segmented; approximate antennal ratio 1.4; palpus 3-segmented; thorax as in female; spurs of tibia II .041, .037 mm; claws spatulate, 7–8 apical teeth; abdomen black-brown, genitalia as in Fig. 20; basistyle .366 mm; dististyle .172 mm; apical spur of dististyle sharp with 3 ovate bristles around it.

Holotype—Female, Argentina, Ushuaia, Tierra del Fuego, January 20–28, 1960 (Wygodzinsky) (AMNH).

Allotype—Mature male pupa, Argentina, Rio Turbio, Santa Cruz, January 17, 1960 (Wygodzinsky) (AMNH).

Larva

Almost mature larva, Fig. 1, 3.7 mm; head brown, .22 mm long; mandible, Fig. 10, .06 mm long with broad lateral tooth and tapering accessory tooth; maxilla small, membranous; palpus consisting of a shallow sclerotized ring and apical projections, Fig. 9; labium as in Fig. 8; antennal ratio 23–5–1–1–(.5?); fifth segment appears to be present; antenna .03 mm long, Fig. 6; labrum with apical spine comb, Fig. 7; no eye spot visible in head.

Thorax cream-colored swollen, Fig. 1; migrated eye spot, as described by Codreanu (1939) for *S. rhithrogenae*, not discernible here; prolegs short.

Abdomen narrower, tan in color; caudal papillae and anal gills not visible; posterior prolegs present, with usual hooks, reduced in size.

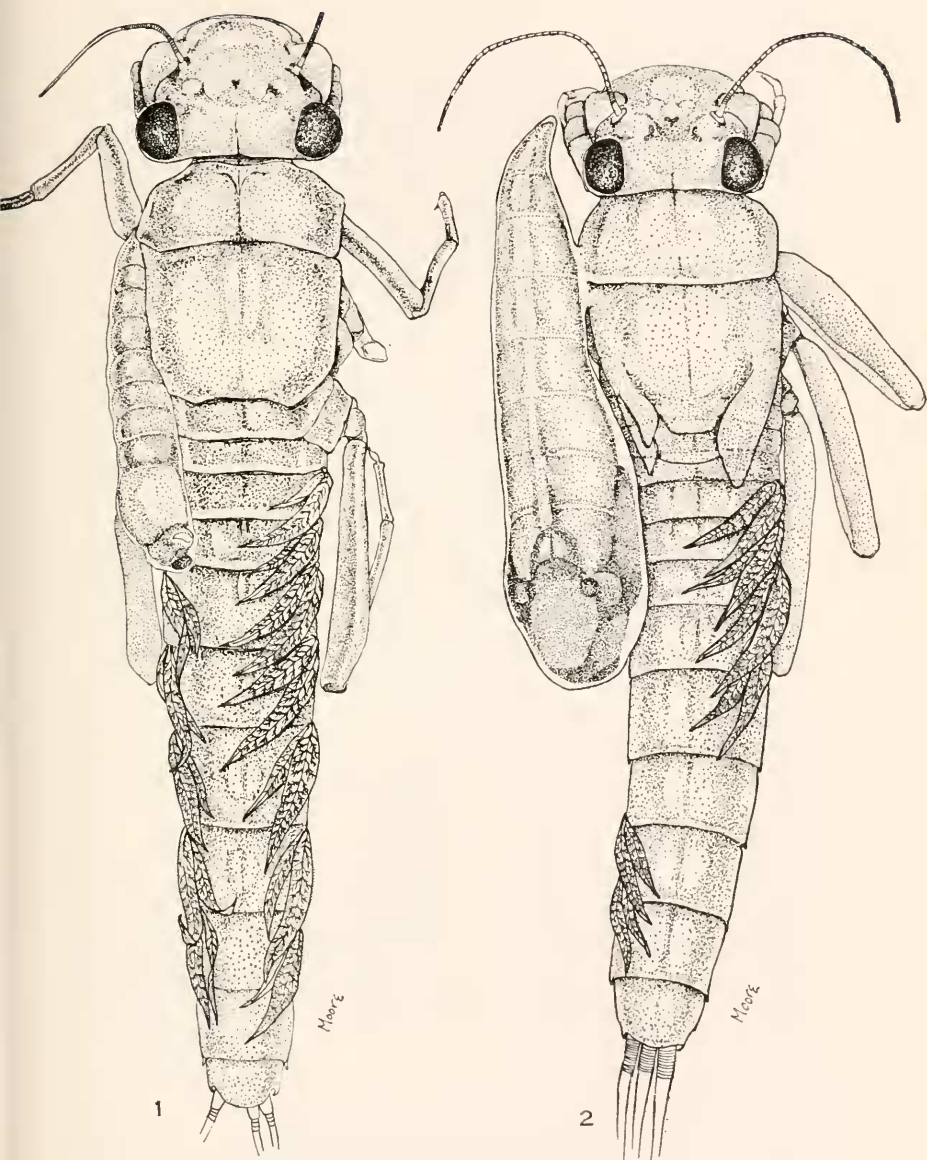


FIG. 1. Larva on female *Thraulodes* nymph.

FIG. 2. Female pupa on female *Thraulodes* nymph.

Pupa

Male pupa 4.5 mm; female pupa, Fig. 2, 4.5–5.1 mm; no thoracic respiratory organs present; scar, as described by Codreanu (1939), ahead of mesothoracic spiracle, present; caudal edges and intersegmental membranes 2–3 and 3–4 with complete dorsal spine rows; these rows mesally broken on 4–5 and more widely broken and restricted to lateral and ventro-lateral areas on 5–6, 6–7, 7–8; apex of abdomen as in Fig. 11; anal fins in male twice length of genital sacs.

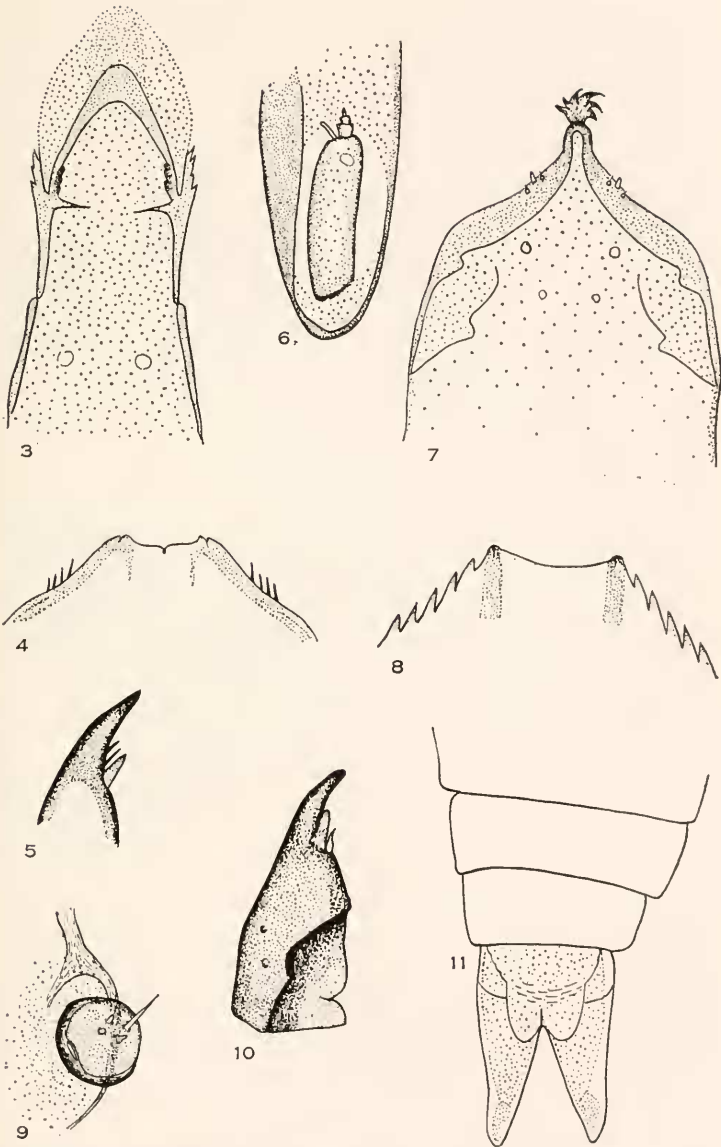
Host

The hosts of *S. (A.) wygodzinskyi* immature stages are leptophlebiid nymphs, Figs. 1, 2, which appear to belong to the genus *Thraulodes*. The Neotropical mayfly nymphs are poorly known and, with few exceptions, there is always an element of doubt in the assignment of a nymph to genus. *Thraulodes* is primarily Neotropical and according to Burks (1953) only two species are known from the Nearctic region. Needham and Murphy (1924) key out 11 species from the Neotropical region. The nymphs here studied differ from the presumed *Thraulodes* nymphs described by Needham and Murphy in having distinct lateral spines on abdominal segments 6–9 rather than 2–9. A few show indications of spines on 2–5 and mature specimens might have the full complement of spines. None of the specimens examined was fully mature.

Labrum three times as long as wide; no mesal depression with teeth; maxillary palpal segments in ratio 40–40–24; femoral spines short, parallel sided; claws with 10–11 teeth on inner margin; gills lanceolate-acuminate, decrease in size on caudal abdominal segments; main trachea with lateral branches; ninth sternite caudally tapering, slightly excavate apically.

Material Examined

Argentina—Ushuaia, Tierra del Fuego, January 20–28, 1960; larva on ♀ nymph (L) (AMNH), 2 ♀♀ pupae on ♀ nymphs (L) (AMNH), ♀ pupa on ♀ nymph, on slide (L) (ANSP).



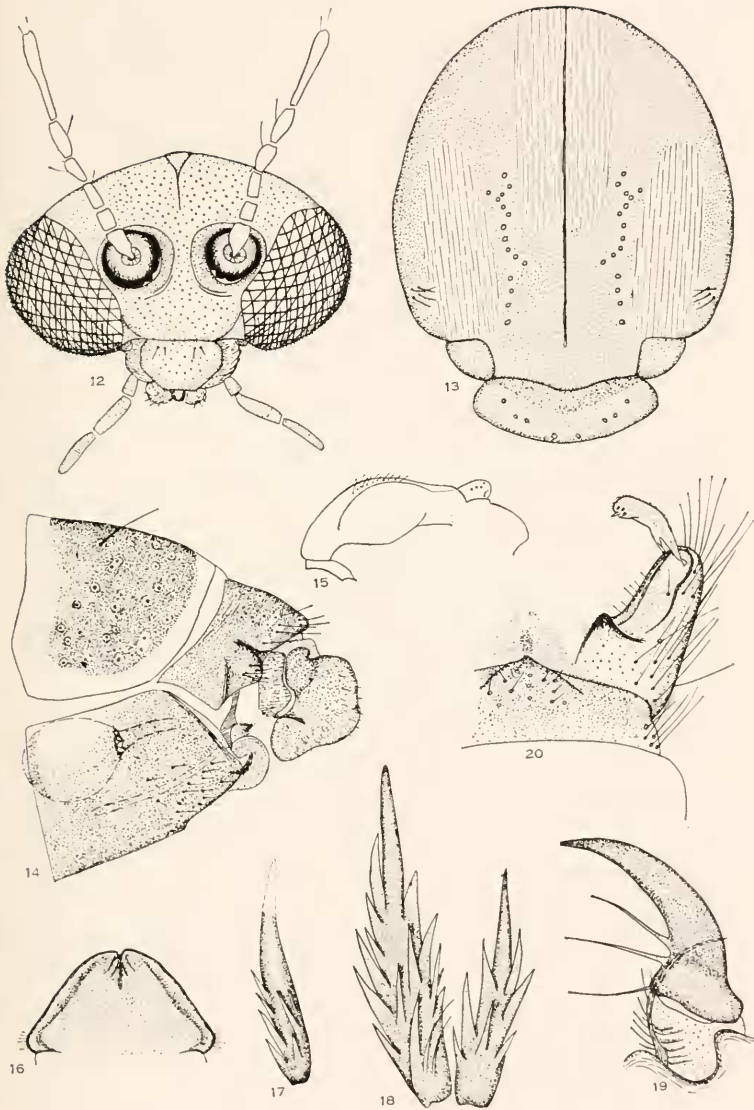
FIGS. 3-5. *Symbiocladius equitans* Claassen, larva. 3. Labrum. 4. Labial plate. 5. Apex of mandible.

FIGS. 6-11. *Symbiocladius (Acletius) wygodzinskyi* Roback, larva. 6. Antenna. 7. Labrum. 8. Labial plate. 9. Maxillary palpus. 10. Mandible. 11. Apex of male abdomen (pupa).

♀ pupa on ♀ nymph (R) (AMNH), ♂ pupa on ♀ nymph (R) (AMNH); Rio Tristen, Ushuaia, Tierra del Fuego, January 20, 1960: ♀ pupa on ♀ nymph (L) (ANSP); Rio Turbio, Santa Cruz, January 17, 1960: 2 ♂♂, 2 ♀♀ pupae (AMNH), 2 ♂♂, 2 ♀♀ nymph (AMNH), ♂ nymph with empty pupal sac (R) (AMNH), ♀ nymph with pupal depression (L) (AMNH), ♀ pupa on ♂ nymph (R) (AMNH), ♂ pupa ♀ nymph (R) (ANSP); 3 larval heads from skins attached to pupae, on slide (ANSP).

Relationship of *S. (A.) wygodzinskyi* to *Thraulodes* nymphs

Unlike the larvae and pupae of *S. equitans* and *S. rhithrogenae* which are situated under the forewing pads of their hosts, the immature stages of *S. wygodzinskyi* are found along the side and dorsally on the *Thraulodes* nymphs, Figs. 1, 2. On some nymphs the caudal end of the *Symbiocladius* pupa was partially under the mayfly wing pad but in no case was the pupa curled with most of the abdomen covered by the wing pad. As can be seen in Fig. 1 the abdomen of the larva is along the lateral edge of the thoracic notum while the head and thorax extend along the lateral edge of the first three abdominal tergites. The pupa in Fig. 2 was mature and ready to emerge; it had pulled slightly away from the body of the nymph. Normally the abdomen of the pupa is downcurved and more closely appressed to the mayfly nymph and in some cases the pupa is farther caudad and its anal fins are under the mesothoracic wing pad. In all cases the immature stages of *Symbiocladius* are completely encased by a membranous sheath which seals them from the outside. This is also the case in the other immature *Symbiocladius* that have been described. In the specimens examined pupae were found on both the left and right sides of the mayfly nymph. Though the sample examined was small it would indicate that the choice of side is random. Of 11 mayfly nymphs with larva or pupa attached, 6 bore the larva or pupa on the left side and 5 on the right. The data on association of pupal and nymphal sex is inconclusive. Of 8 at-



FIGS. 12-20. *Symbiocladius (Acletius) zeygodzinskyi* Roback, adult female. 12. Head. 13. Thorax, dorsal. 14. Apex of abdomen, lateral. 15. Thorax, lateral. 16. Pronotum, anterior view. 17. Spur Tibia I. 18. Spurs tibia III. 19. Claw. 20. Genitalia (adult male).

tached pupae on nymphs, 5 were ♀ on ♀; 2 were ♂ on ♀; 1 was ♀ on ♂. There were no ♂ pupae on ♂ mayfly nymphs.

Almost all of the parasitized *Thraulodes* nymphs were very immature with the wing pads poorly developed. However on the specimen illustrated in Fig. 2 the wing pads are better developed and the reduction in size of the left mesothoracic wing pad is evident. The metathoracic wing pad is exposed instead of being covered as on the right side. Codreanu (1939) has described both asymmetrical and symmetrical reduction of the mesothoracic wing pads in *Heptagenia* and *Rhithrogena* as a result of the presence of the immatures of *S. rhithrogenae*.

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